

We claim:

1. A method of depositing optical quality films by PECVD (Plasma Enhanced Chemical Vapour Deposition), comprising:
depositing an optical film by PECVD (Plasma Enhanced Chemical Vapour
5 Deposition) in the presence of gases; and
controlling the flow rate of at least one of said gases to minimize
unwanted absorption peaks in the deposited film.
2. A method as claimed in claim 1, wherein said optical film is silica.
3. A method as claimed in claim 1, wherein the flow rate of said other gases
10 is maintained substantially constant.
4. A method as claimed in claim 3, wherein the total deposition pressure is
maintained substantially constant.
5. A method as claimed in claim 1, wherein said gases include PH_3 , and the
flow rate of said PH_3 is varied to minimize unwanted absorption peaks in the
15 deposited layer.
6. A method as claimed in claim 5, wherein said other gases comprise SiH_4 ,
 N_2O , and N_2 .
7. A method as claimed in claim 6, wherein the total pressure is also
maintained substantially constant during the deposition.
- 20 8. A method as claimed in claim 2, wherein said at least one gas is a gas
selected from the group consisting of: diborane, B_2H_6 , Arsine (AsH_3), Titanium
hydride, TiH_4 or germane, GeH_4 , Silicon Tetrafluoride, SiF_4 or carbon
tetrafluoride, CF_4 .
9. A method as claimed in claim 1, wherein said gases comprise at least three
25 gases whose flow-rate is maintained substantially constant and a fourth gas
whose flow rate is varied.
10. A method as claimed in claim 9, wherein said three gases comprise SiH_4 ,
 N_2O , N_2 and said fourth gas is PH_3 .

depositing an optical film while maintaining three of said set of four independent variables substantially constant as well as said fifth independent variable, and varying a fourth of said set of four independent variables to obtain desired characteristics in said sixth dimension.

- 5 21. A method as claimed in claim 20, wherein said optical film is a silica film.
22. A method as claimed in claim 21, wherein said gases include a raw material gas, an oxidation gas, a carrier gas, and a doping gas and said set of four independent variables relate respectively to the flow rates of said raw material gas, said oxidation gas, said carrier gas, and said doping gas .
- 10 23. A method as claimed in claim 22, wherein said raw material gas is selected from the group consisting of SiH_4 , silicon tetra-chloride, SiCl_4 , silicon tetra-fluoride, SiF_4 , disilane, Si_2H_6 , dichloro-silane, SiH_2Cl_2 , chloro-fluoro-silane SiCl_2F_2 , difluoro-silane, SiH_2F_2 and any other silicon containing gases involving the use of hydrogen, H, chlorine, Cl, fluorine, F, bromine, Br, and iodine, I.
- 15 24. A method as claimed in claim 23, wherein said oxidation gas is selected from the group consisting of N_2O , oxygen, O_2 , nitric oxide, NO_2 , water, H_2O , hydrogen peroxide, H_2O_2 , carbon monoxide, CO or carbon dioxide, CO_2 .
25. A method as claimed in claim 24, wherein said carrier gas is selected from the group consisting of N_2 , helium, He, neon, Ne, argon, Ar and krypton, Kr.
- 20 26. A method as claimed in claim 25, wherein said doping gas is selected from the group consisting of PH_3 , diborane, B_2H_6 , Arsine (AsH_3), Titanium hydride, TiH_4 or germane, GeH_4 , Silicon Tetrafluoride, SiF_4 and carbon tetrafluoride, CF_4 .
27. A method as claimed in claim 20, further comprising carrying out a post-deposition thermal treatment at a temperature between 400 and 1200°C.
- 25 28. A method as claimed in claim 27, wherein said post-deposition treatment is carried out in the presence of nitrogen.
29. A method as claimed in claim 27, wherein said post-deposition treatment is carried out at a temperature of about 800°C.